

# User's Manual

Single Tank Water Quality System



# Congratulations!

Your Single Tank Water Quality System was designed and manufactured for optimal performance with minimal maintenance. We know you will enjoy its many benefits for years to come. Thank you for choosing our system.

## Owner/user responsibility

Please read this User's Manual carefully and familiarize yourself with your new Water Quality System. With a little preventative maintenance, you can reduce the need for service calls.

## Before calling for service, please check:

- Is the power cable connected to the 12 volt transformer? Is the transformer plugged into a 120V, continuously hot electrical outlet?
  - Does the unit have a sufficient supply of approved salt that has not become hard or bridged?
  - Is the unit protected from freezing, including drain lines and lines to and from the brine-tank?
- Is the unit protected from excessive heat or dampness from sweating pipes or leaks?
- Is the water pressure supply to the unit within the limits set by the manufacturer or has the water source been changed?

Be sure your dealer fills in the information below when your Water Quality System is installed.

Model \_\_\_\_\_

Controller Number \_\_\_\_\_

Valve Serial Number \_\_\_\_\_

Date of Installation \_\_\_\_\_

Dealer \_\_\_\_\_

Address \_\_\_\_\_

Service Phone \_\_\_\_\_

## Water Analysis

Hardness \_\_\_\_\_ GPG

Iron \_\_\_\_\_ PPM

pH \_\_\_\_\_

Other \_\_\_\_\_

# Installation Checklist

- ☐ Water pressure should be at least 20 pounds per square inch. If pressure is over 80 PSI, install a pressure reducer. (Most hot water heaters are rated at 75 PSI working pressure.)
- ☐ Flow rate should be at least 4.5 gallons per minute at 20 PSI
- ☐ Drain availability—floor drain, washer drain, etc. Run overhead no more than 5 feet above the water softener. Increase the size of the drain for long runs. All plumbing codes require a 3-inch air gap at the end of the drain line.
- ☐ Electricity—continuously hot receptacle of 120 volts, 60 cycles.
- ☐ Water quality—If the water supply contains sulphur, iron, bacteria, tannins, algae, oils, acids, salt or other unusual substances, your system may require pretreatment.

## Do...

- Install the system after the pressure tank. Ask for advice on any special plumbing arrangement.

Comply with all local plumbing and electrical codes.

- Examine inlet piping. If it is clogged, replace or clean it. Minimum size should be 3/4 inch nominal.
- Install gravity drain on the brine tank.

## Don't...

- Don't install if inlet water temperature exceeds 120°F.
- Don't allow heat from torches to be transferred to plastic or valve parts.

# Softener Installation

## (Single Tank System)

### 1. Select location for water softener.

- Place as close as possible to pressure tank (well water) or water meter (city water).
- Place as close as possible to floor drain, laundry drain or sump.
- Attach softener to the main water pipe before the water heater.
- Bypass outside water faucets to conserve soft water and salt.
- Place softener where it will not freeze.
- A 120V electrical outlet must be near. If softener is to be placed outside, care must be taken to protect all electrical wires, transformer and the electronics.
- Softener should be protected from direct sunlight.
- Floor surface must be smooth and level.

### 2. Open boxes to verify that there is no damage from shipping and all parts are included.

#### Demand System

Hood with wiring and controller

Turbine with quest nut

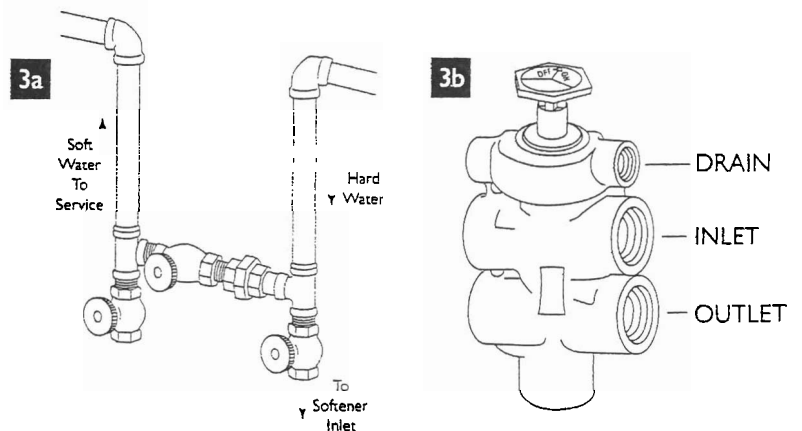
12 V (Black) transformer

Black knob - stud (in plastic bag attached to control valve)

#### Time System

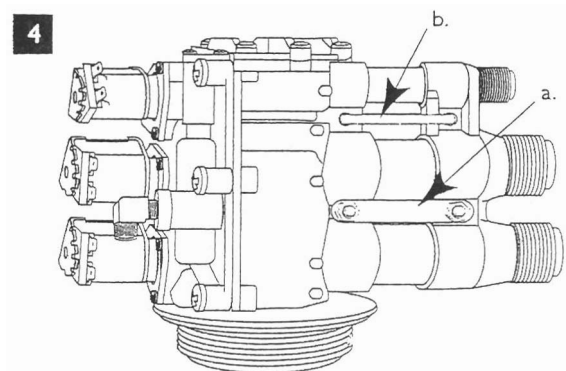
Includes everything listed under Demand System except the turbine and quest nut

### 3. Provide an in house bypass valve (3a) or optional brass bypass valve. (3b)



### 4. Attach the noryl adapter (or optional brass bypass valve) to the back of the control valve using the black in and out nipples to make the connection.

Use a small amount of silicone grease on nipple O-rings to prevent damage. (4) Secure with the connector bars and pan head screws (a). Use clevis in top holes. (b)



5. Connect the softener

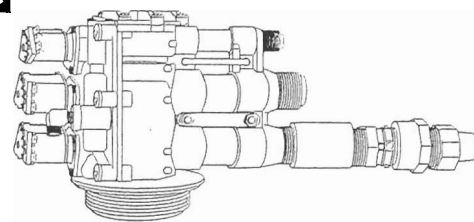
A. ELECTRONIC DEMAND SYSTEM

- Remove the sensor cable from the turbine.  
Spread the clips on each side on the turbine housing and pull sensor out.
- Remove small turbine O-ring around the mouth of the sensor cavity.  
Remove the impeller assembly from the turbine housing. (Replace later)
- Attach the turbine to the lower 1" opening of the adapter using a 1" PVC coupling (5a, 5b, or 5c).  
Leave the sensor cavity in a horizontal position for easy access and to prevent water from collecting in the hole.
- Connect the turbine to the soft water line of the 3 valve bypass. Use the quest nut or optional 1" nut with 4" copper tail pipe to provide a union for access to the turbine.
- Plumb the main hard water line from the 3 valve bypass into the top 1" (inlet) opening on the adapter.

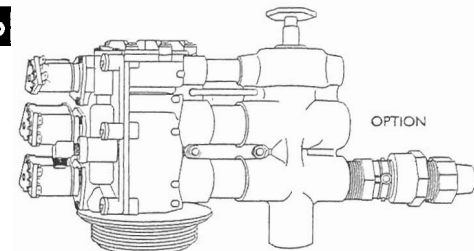
B. ELECTRONIC TIME SYSTEM

- Since there is no turbine to install, plumb the main hard water line into the top 1" opening of the adapter.  
Plumb the soft water line into the bottom 1" opening of the adapter.

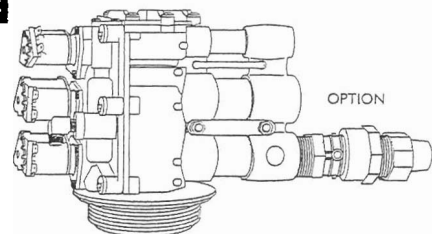
5a



5b



5c



6. Install Drain Line

- Install a 5/8" ID flexible tube for drain using a 1/2" barb fitting (not included).  
Increase size of drain if it will run overhead or for a long distance.

7. Install the brine tank.

- Remove the safety float from the brine well.
- Check the valve fittings.
- Remove the rubberband from the bottom of the float and return float to the brine well.
- Attach the 3/8" clear plastic tube from the control valve to the upper elbow that protrudes from the side of the brine tank.
- An overflow drain is located about half way up the side of the brine tank.
- Connect a 1/2" plastic tube to the overflow drain elbow and run to a floor drain or sump.

8. Flush cuttings and other debris from the lines.

A. FOR A 3 VALVE BYPASS

Open a nearby cold water faucet.

- Bypass the system by closing the inlet and outlet valves. Open the center bypass valve.
- Open the main water shut off valve, to flush the lines.
- Place the bypass in service. Close the center bypass valve. Open the outlet valve. Slowly open the inlet valve pausing several times to allow air to escape and pressurize the softener slowly.
- Close the water faucet.

## B. FOR A BRASS BYPASS

- Place the bypass valve into the bypass position by pulling the bypass rod up until it stops. Turn the knob 1/4 turn to lock it into place.
- Open a nearby cold water faucet.
- Open the main water shut off valve to flush the lines.
- Close the main water shut off valve
- Push the bypass rod all the way down to put it into the service position.
- Close the water faucet.
- Open the main shut off valve to pressurize the system.
- Check for leaks.

## 9. Replace impeller assembly in turbine.

- Close main water shut off valve.
- Open a nearby faucet to relieve pressure.
- Loosen the Quest nut on the turbine and reinstall the impeller assembly.
- Retighten the Quest nut.
- Close faucet and reopen main water shut off valve.

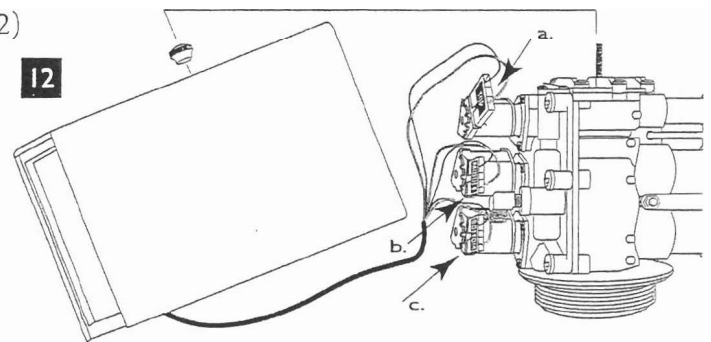
## 10. Check the system for leaks.

## 11. Install controller hood.

- Remove stud from plastic bag attached to the control valve and screw it into the tapped hole in the center of the top lid of the control valve.

## 12. Attach the solenoid harness to the control valve. (12)

- Connect the red and white cable to the top solenoid coil.(a)
- Connect the green and white cable to the middle solenoid coil.(b)
- Connect the black and white cable to the bottom solenoid coil.(c)

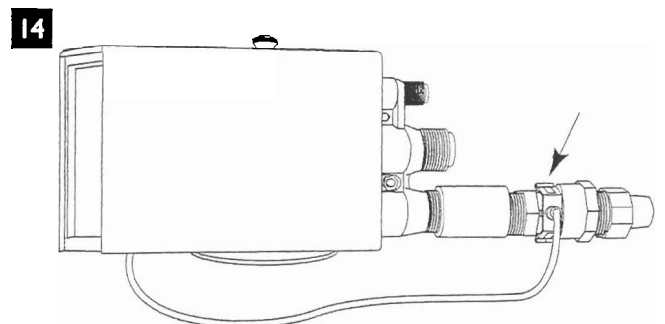


## 13. Complete installation of controller hood.

Place the hood over the top of the control valve and allow the stud in the top lid to come through the small hole in the top of the hood. Secure the hood with the black knob.

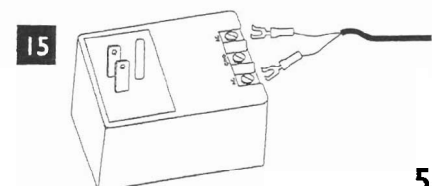
## 14. Replace the turbine sensor. (14)

- Replace the turbine O-ring around the opening of the sensor cavity.
- The proper position for the sensor is identified by a square projection on the clip and a corresponding female depression on the turbine housing.
- Slip the sensor into the cavity.
- Press gently until both sides of the clip have snapped into place.



## 15. Attach power cable to the outside two connections of the 12 volt transformer. (15)

Plug transformer into a continuously hot 120V electrical outlet.



# Softener Start Up

Remove the acrylic door from the front of the controller hood.

## 1. Program the STC (single tank controller)

### STEP 1. SET THE CLOCK

Press the scroll button. A red light will appear next to "Set Clock".

Press the up or down button under change valve to set the proper 24 hour time. The speed increases with the length of time button is depressed.

### STEP 2. SET REGENERATION TIME

Press scroll. The red light will move to "Set Regeneration Time".

Press the up or down button to set the proper 24 hour (military time) regeneration time.

### STEP 3. SET REGENERATION INTERVAL

Press scroll. The red light will move to "Set Regeneration Interval in Days".

Press the up or down button to set proper regeneration interval. (1-7 days).

Leave setting on auto for demand regeneration. When the system is demand and is set for time regeneration, it will regenerate on the basis of both time and demand.

### STEP 4. SELECT TANK SIZE

Press scroll. The red light will move to "Select Tank Size".

Press the up or down button to select the proper tank size.

### STEP 5. SELECT PULSE OR NON PULSE

Press scroll. The red light will move to "Select Pulse or Non Pulse".

Press up or down button to select yes for pulse or no for non pulse.

### STEP 6. SET COMPENSATED HARDNESS

See chart on page 9 to calculate compensated hardness before proceeding. Press scroll. The red light will move to "Set Compensated Hardness".

Press up or down button to set the proper compensated hardness.

### STEP 7. RETURN TO SERVICE

Press scroll to return system to service.

During service, a demand system will display gallons remaining before regeneration and time of day alternately every 5 seconds. A time system will display total gallons between regeneration and time of day.

## 2. Sanitize the softener

- Remove the brine tank cover. Use a hose or pail to fill brine tank with 3 or 4 gallons of water.
- Remove the brine well cover and pour about 1/3 cup of household bleach into the well. Replace brine well cover.
- Press the manual activate button on the STC to start a regeneration. The first regeneration does a number of things:

It draws the bleach into and through the system to sanitize it.

It refills the brine tank to the water level needed for the next regeneration.

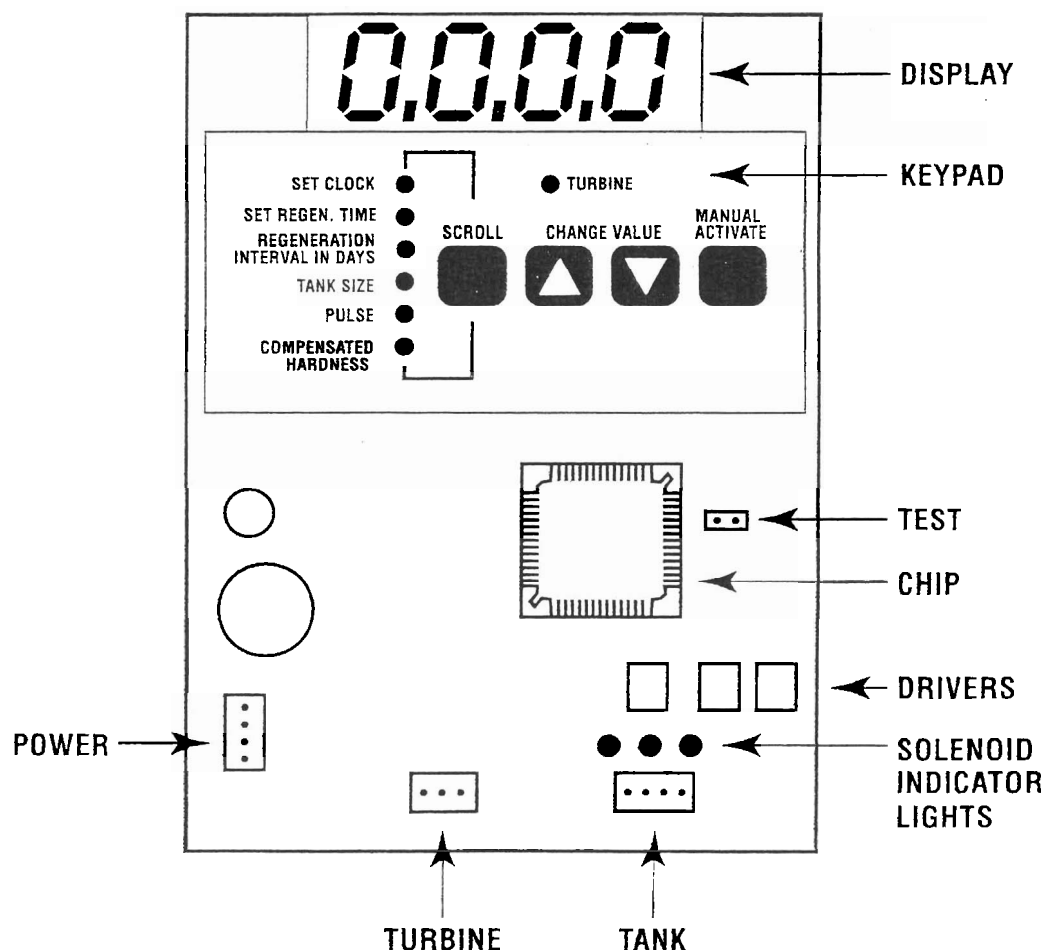
It purges any remaining air from the resin tank.

It settles the bed for service.

## 3. Fill the brine tank with salt.

- Use a good brand of solar or pellet salt.
- Be sure the brine well cover is in place.
- Place salt in the brine tank.
- Replace brine tank cover.

# Single Tank Controller (STC)





# Additional Features For Service Technicians

## 1. Manual activate -- MANUAL REGENERATION

- Press manual activate button to start a regeneration.
- To stop regeneration continue to press the manual activate button to step the system through all regeneration cycles back to service.

## 2. JP2 Prong -- TURBINE COUNTER

- Important: Disconnect the turbine cable before using this feature.
- Connect the prongs and maintain the connection.
- The system will count gallons down to 0 to determine whether the controller will initiate a regeneration on its own.

## 3. JP3 Prong -- TEST FEATURE

Connect the JP3 prongs to activate the test feature. Test will appear on the display. Each solenoid can be energized individually or in combination of two.

- Press the up button to energize the number 1 solenoid. (Brine draw)
- Press the down button to energize the number 2 solenoid. (Back wash)
- Press the manual activate button to energize the number 3 solenoid. (Down flow purge and brine tank refill)
- Press the appropriate button a second time to de-energize the solenoids.
- Press scroll to return to service.

## 4. S1 -- SOLENOID INDICATOR LIGHTS

From left to right

- First light represents the #1 (Top) solenoid (Brine draw)
- Second light represents the #2 (Middle) solenoid (Back wash)
- Third light represents the #3 (Bottom) solenoid (Purge and brine tank refill).

NOTE: Both the number 1 and number 2 solenoids must be activated to put the system into back wash. The number one solenoid valve must be open during back wash to provide an opening for the back wash water from the number two solenoid valve to exit the control valve.

**IMPORTANT:** Always turn #1 solenoid off first - wait at least 10 seconds then turn off #2 solenoid.

- The controller will return to service if it is left in the programming stage for more than 5 minutes.
- The controller may not proceed to 0 gallons before the system regenerates.

## 5. TURBINE INDICATOR LIGHT

Red light flashes when meter turns indicating water use.

# Programming the Controller

## Calculating compensated hardness

1. Enter grains per gallon of hardness here. \_\_\_\_\_
2. Enter PPM of iron here.   + \_\_\_\_\_
3. Add lines 1 and 2 and enter result here.       = \_\_\_\_\_
4. Enter the appropriate compensation factor from chart at right here.   x \_\_\_\_\_
5. Multiply the sum from line 3 by the compensation factor on line 4. Enter result here.       = \_\_\_\_\_

## Compensated hardness factors

| Result from step 3 | Compensation factor |
|--------------------|---------------------|
| 1-20 .....         | 1.1                 |
| 21-40 .....        | 1.2                 |
| 41-70 .....        | 1.3                 |
| 71-100 .....       | 1.4                 |
| 100+ .....         | 1.5                 |

### EXAMPLE

```

    10   Grains
  +  3   PPM Iron
  = 13   Total Hardness
  x 1.1   Compensation Factor for 13 gr H2O
  = 14.3  Compensated Hardness
  
```

# Quick Service Guide

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## Unit fails to regenerate

| Cause   | Solution                         |
|---|----------------------------------|
| Electrical service to unit has been interrupted | Assure constant power source     |
| STC is defective                                | Replace STC                      |
| Solenoid coils burned out                       | Replace solenoid coils           |
| Drain is frozen or plugged                      | Thaw out, replace or clean drain |

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## Unit delivers hard water

| Cause                                   | Solution  |
|---|---|
| Bypass open                             | Close bypass  |
| Bypass O-ring damaged                   | Replace O-ring(s)   |
| No salt or salt is hard or bridged      | Add salt or break up bridging                                     |
| Aspirator plugged                       | Clean aspirator   |
| Insufficient water refilling brine tank | Check #3 solenoid coil, refill flow control and tank size setting |
| Cracked riser tube                      | Replace riser tube  |
| Back pressure on drain                  | Correct drain   |
| Broken vacuum breaker spring            | Replace spring  |
| #2 solenoid inoperative                 | Clean solenoid valve<br>Replace solenoid coil                     |

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## Unit uses too much salt

| Cause                             | Solution   |
|-----------------------------------|--|
| Improper tank size setting        | Reset tank size  |
| Excessive water in the brine tank | Defective #1 solenoid.<br>Trash in the brine suction line or under the brine elbow. Trash under the #3 solenoid diaphragm. |

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## Loss of water pressure

| Cause                                 | Solution   |
|---------------------------------------|--|
| Iron buildup in the lines to the unit | Clean or replace lines                                   |
| Iron buildup in the unit              | Clean unit with acid or salt additive                    |
| Trash in the system                   | Clean complete control valve and bypass. Add pre-filter. |
| Clogged upper distributor             | Remove and clean upper distributor.                      |

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## Loss of resin through house lines

| Cause                       | Solution                  |
|-----------------------------|---------------------------|
| Defective lower distributor | Replace lower distributor |

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## Iron in conditioned water

| Cause                      | Solution  |
|----------------------------|---|
| Salt dosage too low        | Reset controller or increase size of flow control |
| No salt usage              | Correct bridging                                  |
| Oxidized or colloidal iron | Install post-filter (1 or 2 micron)               |

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## Excessive water in brine tank

| Cause  | Solution  |
|--|---|
| #3 solenoid valve leaking  | Clean #3 solenoid valve and check for bent solenoid guide |
| Purge check leaking  | Check for trash   |
| Aspirator plugged  | Clean aspirator   |
| #1 solenoid coil inoperative                                       | Replace #1 solenoid coil                                  |
| Blue dot elbow leaking back to B.T. when unit is not regenerating. | Replace elbow or rubber ball - if worn.                   |

# Quick Service Guide, *continued*

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## Unit fails to draw brine

| Cause                        | Solution                       |
|------------------------------|--------------------------------|
| Drain line plugged/frozen    | Clean drain line               |
| Aspirator plugged            | Clean aspirator                |
| #1 solenoid coil inoperative | Replace #1 solenoid coil       |
| Low water pressure           | Correct pressure               |
| Trash in the purge check     | Clean purge check              |
| Brine tube disconnected      | Replace or tighten brine tube  |
| #2 solenoid coil inoperative | Clean or replace solenoid coil |

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## Water runs to drain continuously

| Cause                                   | Solution                                |
|---|---|
| Trash under #1 or #3 solenoid diaphragm | Clean or replace solenoid diaphragms    |
| Bent solenoid guide                     | Replace solenoid guide                  |
| Broken solenoid spring                  | Replace solenoid spring                 |
| Cage O-ring broken or missing           | Replace cage O-ring                     |
| Cracked top lid                         | Replace top lid                         |
| Piston return spring caught             | Replace or realign piston return spring |

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## Brine tank does not refill

| Cause                             | Solution  |
|-----------------------------------|---|
| #3 solenoid coil inoperative      | Replace solenoid coil   |
| Refill flow control plugged       | Clean or replace flow control                                   |
| Driver on STC inoperative         | Replace STC   |
| #1 solenoid valve not seating out | Remove trash from under diaphragm. Check for swelling - replace |

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## Vacuum breaker leaks

| Cause   | Solution         |
|---|------------------|
| Foreign matter in lip of vacuum breaker split ball check. | Clean or replace |

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## Odor

| Cause                                   | Solution                      |
|---|-------------------------------|
| Anode rod                               | Remove rod                    |
| Sulfur of methane                       | Consult dealer                |
| Other organics water conditions changed | Other equipment may be needed |

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## Salty water after regeneration

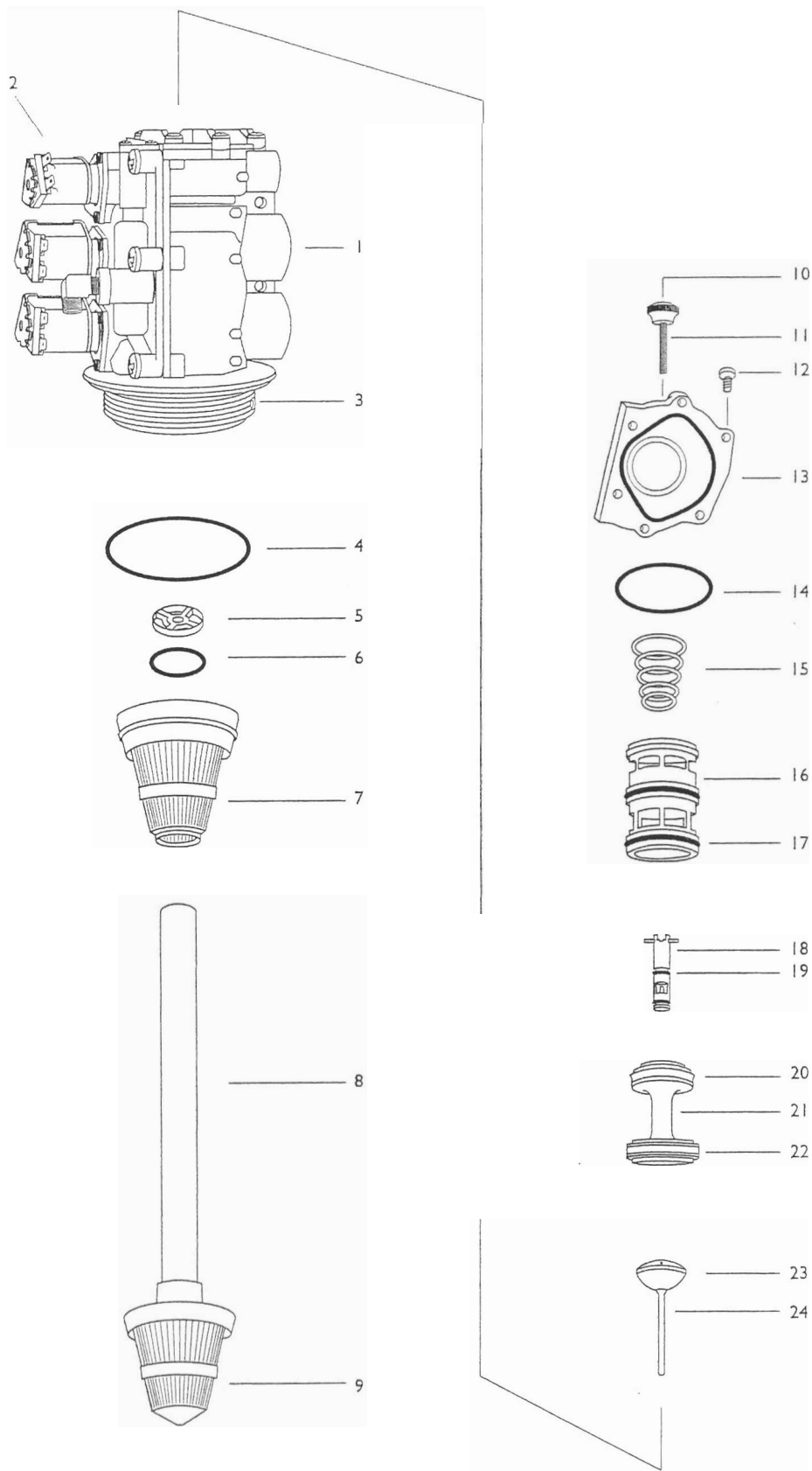
| Cause                                | Solution   |
|--------------------------------------|--|
| Low water pressure                   | Increase water pressure                              |
| #2 solenoid coil inoperative         | Check power or replace                               |
| Too much water in brine tank         | Check brine refill for continuous flow               |
| Test water for chlorides or nitrates | Add R.O. for drinking or find a new source of supply |
| Air leak in brine tubing harness     | Replace or tighten fittings that leak                |

# Control Valve Assembly

| Ref. No. | Part Number   | Description   | Units per Assy. |
|----------|---------------|---|-----------------|
| 1        | A11NC4182*    | Control valve body (brass or noryl)                           | 1               |
| 2        | A1CM24VCB*    | Control module assy, complete                                 | 1               |
| 3        | 13SCR612SS    | Upper distributor mounting screw<br>#6 X 1/2 PL FH SM 18-8 SS | 2               |
| 4        | 14ORING235    | Valve base O-ring #235  | 1               |
| 5        | 11CKSTEMGUIDE | Check stem guide  | 1               |
| 6        | 14ORING121    | Riser tube O-ring #121  | 1               |
| 7        | 16UDSS6       | Braswell upper distributor                                    | 1               |
| 8        | 54T1050FT     | Riser tube  | 1               |
| 9        | 54LD15SEG     | Braswell lower distributor                                    | 1               |
| 10       | 36NUTKB1032   | Black knob  | 1               |
| 11       | 59STUD1032114 | Stud 5/32 X 1 18-8 SS   | 1               |
| 12       | 13SCR103212SS | Top lid mounting screw<br>5/32 X 1/2 PL RH MS 18-8 SS         | 6               |
| 13       | 11TOPLID      | Top lid   | 1               |
| 14       | 14ORING142    | Top lid O-ring #142   | 1               |
| 15       | 15PISTONSPG   | Piston return spring  | 1               |
| 16       | 11PISTONCAGE  | Piston cage   | 1               |
| 17       | 14ORING127    | Cage O-ring #127  | 3               |
| 18       | A11ASPIRATOR* | Aspirator   | 1               |
| 19       | 14ORING010    | Aspirator O-ring #010   | 2               |
| 20       | 14PISTONCUPSL | Piston cup seal   | 1               |
| 21       | 11PISTON      | Piston  | 1               |
| 22       | 14PISTONGASK  | Piston gasket   | 2               |
| 23       | 14STEMCKSEAL  | Stem check seal   | 1               |
| 24       | 11STEMCK      | Stem check  | 1               |

\*Specify tank size

# Control Valve Assembly

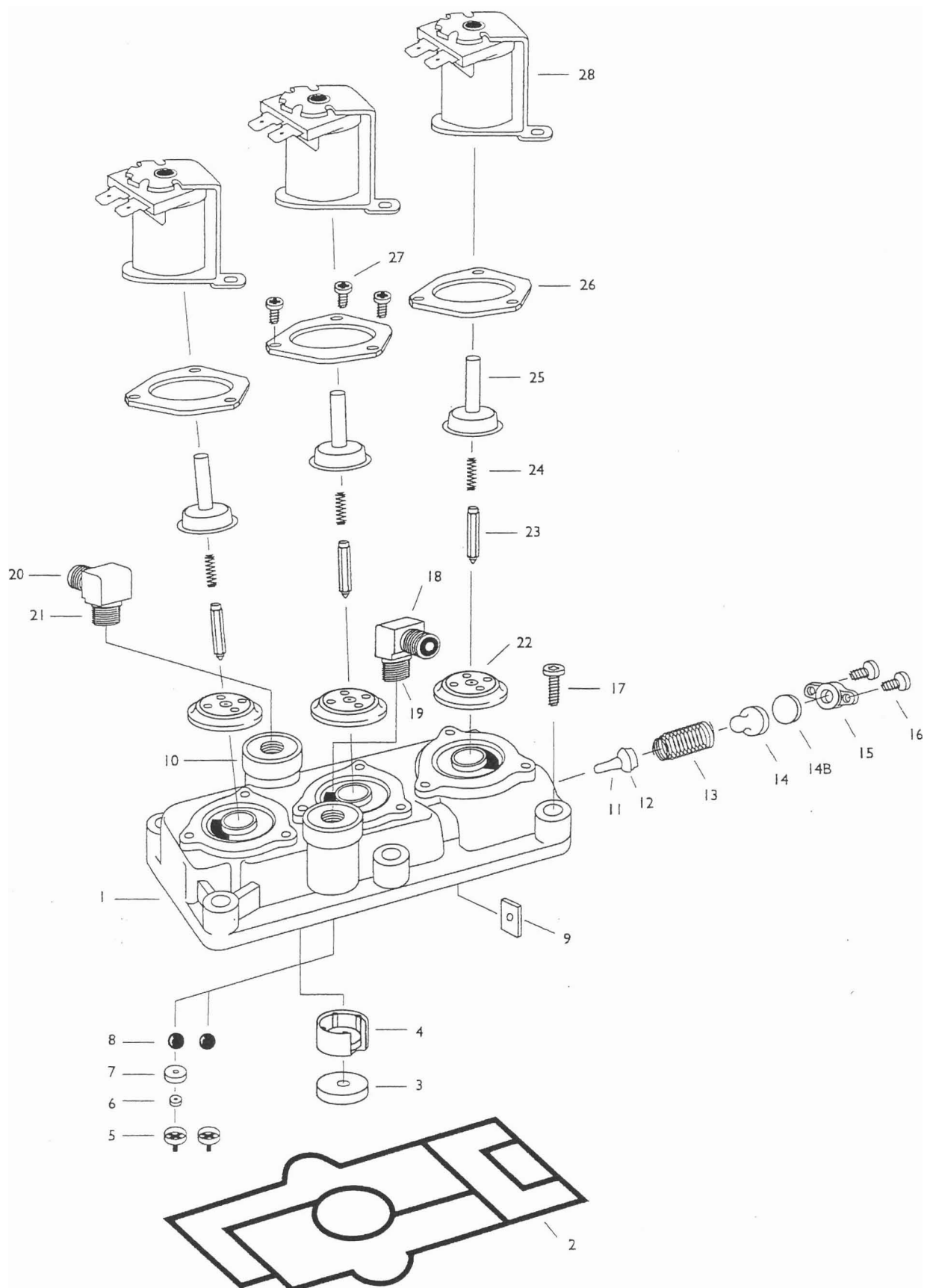


# Control Module Assembly

| Ref. No. | Part Number   | Description   | Units per Assy. |
|----------|---------------|---|-----------------|
| 1        | A11CMBDY      | Control modular body  | 1               |
| 2        | 14CMSEAL      | Control module seal   | 1               |
| 3        | 14BWFC*       | Backwash flow control   | 1               |
| 4        | 11BWFCSUP     | Backwash flow control support   | 1               |
| 5        | 11BDRKEEPER   | Brine draw and refill keeper  | 2               |
|          | 14RFC*        | Refill flow control   | 1               |
| 7        | 11RFCRETAIN   | Refill flow control retainer  | 1               |
| 8        | 14516CKBALL   | $\frac{5}{16}$ diameter check balls   | 2               |
| 9        | 11PURGEGATE   | Purge gate  | 1               |
| 10       | 15BRRING1458  | Brass ring  | 2               |
| 11       | 11PURGECK     | Purge check   | 1               |
| 12       | 14PURGESEAL   | Purge check seal  | 1               |
| 13       | 15VBSPG       | Vacuum breaker spring   | 1               |
| 14       | 14VBBALLCK    | Vacuum breaker split ball check   | 1               |
| 14B      | 15FELTPD      | Felt pad  |                 |
| 15       | 11VBCOVER     | Vacuum breaker cover  | 1               |
| 16       | 13SCR838SS    | Vacuum breaker mounting screw #8 X $\frac{7}{16}$                                       | 2               |
| 17       | 13SCR142034SS | Control module mounting screw<br>$\frac{1}{4}$ -20 X $\frac{3}{4}$ PL PAN HD MS 18-8 SS | 6               |
| 18       | 1538BRELB18MP | Brass elbow $\frac{3}{8}$ OD X $\frac{1}{8}$ MPT  | 1               |
| 19       | 11INSSTOP     | Ball check stop insert (outlet)   | 1               |
| 20       | 1538BRELB18MP | Brass elbow $\frac{3}{8}$ OD X $\frac{1}{8}$ MPT  | 1               |
| 21       | 11INSSEAT     | Ball seat insert (inlet)  | 1               |
| 22       | 12SOLDIPHAG   | Solenoid diaphragm high lift  | 3               |
| 23       | 12SOLARMATURE | Solenoid armature   | 3               |
| 24       | 12SOLSPRING   | Solenoid spring   | 3               |
| 25       | 12SOLGUIDE    | Solenoid guide  | 3               |
| 26       | 12SOLRETAINER | Solenoid retainer   | 3               |
| 27       | 13SCR838SS    | Solenoid mounting screw #8 X $\frac{7}{16}$ SS  | 9               |
| 28       | 12SOL24P      | Solenoid  |                 |

\*Specify tank size

# Control Module Assembly





# Limited Residential Warranty

This warranty is extended to the original owner only and is not transferable so subsequent owners of this equipment.

To place the equipment under warranty, THE WARRANTY REGISTRATION CARD MUST BE COMPLETED IN ITS ENTIRETY AND RETURNED TO 415 E. WASHINGTON ST., Jackson, Missouri 63755, within thirty (30) days of installation by a factory-authorized dealer.

## Terms

The manufacturer warrants its equipment to be free of defects of workmanship and materials for the following terms.

Defective parts will be repaired or replaced FOB Factory when received from the original owner along with the serial number.

5 Years: From date of manufacture of valve bodies. The brine tank and mineral tank if not exposed to direct sunlight.

5 Years: From date of manufacture of all electronic controls, control valve solenoids, gaskets, springs and seals.

## Limitations

Your equipment must be sold by an authorized dealer in order to receive benefits of this warranty.

This warranty does not cover damage due to:

- abuse, misuse or neglect
- excessive water pressure (over 125 PSI)
- excessive water temperature (over 120°F)
- freezing
- alterations
- application or installation not in accordance with published factory specifications or the instructions provided in the users manual or not conforming to local codes
- over-chlorinated water (over 1.5 ppm residual)
- any other act of God not reasonably within the dealer's or manufacturer's power to prevent or control.

This warranty does not cover labor or service call costs incurred with respect to the removal or replacement of any defective part or parts.

Bacterial iron, algae, sand or other unusual substances present in the water to be processed must be removed before entering this product.

There are no other warranties, expressed or implied, other than stated in this document to the extent permitted by local and state laws.

The manufacturer, shall not be liable for indirect, special or consequential damages in connection with the use of this equipment to the extent allowed by local state laws.